

Abstract

The invention provides an arc coating apparatus having a steering magnetic field source comprising steering conductors disposed along the short sides of a rectangular target behind the target, and a magnetic focusing system disposed along the long sides of the target in front of the target which confines the flow of plasma between magnetic fields generated on opposite long sides of the target. The plasma focusing system can be used to deflect the plasma flow off of the working axis of the cathode. Each steering conductor can be controlled independently. In a further embodiment, electrically independent steering conductors are disposed along opposite long sides of the cathode plate, and by selectively varying a current through one conductor, the path of the arc spot shifts to widen an erosion corridor. The invention also provides a plurality of internal anodes, and optionally a surrounding anode for deflecting the plasma flow and preserving a high ionization level of the plasma. The invention also provides a shield at floating potential, restricting the cathode spot from migrating into selected regions of the target evaporation surface outside of the desired erosion zone. The shield may be positioned immediately above the region of the target surface in the vicinity of the anode, protecting the anode from deposition of cathodic evaporate and providing better distribution of cathodic evaporate over the substrates to be coated. The invention further provides correcting magnets adjacent to the short sides of the target, to move the arc spot between the long sides.